CLAIMS

1. A method of making sheet material of a magnesium containing aluminum alloy for sheet metal forming, said method comprising:

continuously casting a composition consisting essentially, by weight, of 3.5 to 5.5% magnesium, 0.4 to 1.6% manganese, 0 to 0.5% chromium, 0.2 to 2.0% copper and aluminum to form a cast slab with an ascast gage of about 5 to 35 millimeters;

hot rolling said cast slab through at least one hot roller stand to form a hot rolled strip that emerges from said rolling at a temperature in the range of 200°C to 350°C and having experienced a thickness reduction from the cast slab of 30 to 80% with a rolled strip thickness of about 3 to 12 millimeters;

immediately coiling said hot rolled strip;

annealing the coiled strip at 450°C to 560°C for 3 to 30 hours to produce a microstructure comprising equi-axed grains with dispersed intermetallic particles; and

cold rolling said annealed strip through at least one cold rolling stage, without intermediate anneal, to effect a reduction of at least 50% in the thickness of the hot rolled strip and to yield said sheet material.

- 2. The method as recited in claim 1 in which said composition contains 4.5 to 5% magnesium.
- 3. The method as recited in claim 1 in which said composition contains 0.5 to 1% manganese.
- 4. The method as recited in claim 1 in which said composition contains 0.5 to 1% copper.
- 5. The method as recited in claim 1 in which said hot rolled strip emerges from said rolling at a temperature in the range of 230°C to 330°C.

- 6. The method as recited in claim 1 comprising annealing said coiled strip at 500°C to 550°C for 5 to 15 hours.
- 7. The method as recited in claim 1 comprising cold rolling said annealed strip to effect a reduction of 50 to 90% in the thickness of said hot rolled strip and to form a said sheet material less than 4 millimeters in thickness.
- 8. The method as recited in claim 1 further comprising heating said cold rolled sheet material to recrystallize it to a microstructure characterized by grains no larger than about 10 micrometers.
- 9. The method as recited in claim 1 where said recrystallized sheet material has an elongation of at least 300% in tensile test at 500° C and a strain rate of 10⁻³s⁻¹.
- 10. A method of making sheet material of an aluminum alloy for sheet metal forming, said method comprising:

continuously casting a composition consisting essentially, by weight, of 4.5 to 5.5% magnesium, 0.5 to 1.0% manganese, 0.05 to 0.3% chromium, 0.5 to 1.% copper, 0 to 0.2% zirconium, and aluminum to form cast slab with an as-cast gage of about 6 to 30 millimeters;

hot rolling said cast slab through at least one hot roller stand to form a hot rolled and hot worked strip that emerges from said rolling at a temperature in the range of 230°C to 330°C and having experienced a thickness reduction from the cast slab of 30 to 80% with a rolled strip thickness of about 3 to 12 millimeters;

immediately coiling said hot rolled strip;

annealing the coiled strip at 500°C to 550°C for 5 to 15 hours to produce a microstructure comprising equi-axed grains with dispersed intermetallic particles; and

cold rolling said annealed strip through at least one cold rolling stage, without intermediate anneal, to effect a reduction of at least 50% in the thickness of the hot rolled strip and to yield said sheet material.

- 11. The method as recited in claim 10 further comprising heating said cold rolled sheet material to recrystallize it to a microstructure characterized by grains no larger than about 10 micrometers.
- 12. The method as recited in claim 10 where said recrystallized sheet material has an elongation of at least 300% in tensile test at 500° C and a strain rate of 10^{-3} s⁻¹.